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Rochester Institute of Technology

A Thesis Submitted to the Faculty of the
College of Imaging Arts and Sciences
in candidacy for the degree of
Master of Fine Arts

The Visualization of Time
by Li Huai Chang

May 20, 2005

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The Visualization of Time

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Rochester Institute of Technology

Computer Graphics Design

Thesis Report

00.Initiation

The initial intention of *The Visualization of Time* will take the concept of time management and integrate visualization for communication. I intend to develop an interactive, dynamic visual calendar. Image integration, icons and symbols, content input by the user, and file management are important to the success of the project. The visual project will allow users to build their own dynamic calendar and an image diary.

However, when this project was started off with programming part, I realized that a finished interactive online calendar needs to be implemented with not only Macromedia Flash Actionscript, but also other Computer Languages which are beyond my knowledge; they are XML, PHP, MySQL. Here I faced a serious situation that if I continued this project, since I couldn't handle and solve most programming problems, the final project would possibly use prototype format as the resulting style.

Fortunately, my thesis committee provided me another solution as an alternative. They suggested that based on the thesis title, *The Visualization of Time*, questions about how "Time" could relevant to "Visual" and how they could incorporate in computer graphics design deserve considerations. I soon decided and re-arranged the new working content. By this section of Initiation, I would like to state the correction of my thesis project which the concept has been different from my thesis proposal. And the following is my thesis report produced with new concept.

01. Abstract

"Time" is a broad issue which has various kinds of solutions to deal with in design. *The Visualization of Time* takes time concept and integrates visualization for communication. I explore both concrete and abstract concept of time and intend to create an interactive environment bringing users a dynamic visual experience.

The concrete concept of time discusses the power of time in nature. Think about the floating Time River brings days and nights, changes the tinges of nature in seasons. I, therefore, decided to create a visual Chinese garden to express time magic. Image Integration, storytelling, motion graphics are incorporated in this part of visual project. Pixel Art is style.

Based on the abstract concept of time, the other half part of this project is developed as individual introspection. I believe that people would more or less like to spend time alone and have communication with themselves. For that, I intend to create a visual calendar diary, which allows users to click on a day/time and type their messages in. Besides, some little characters are created in this section to provide visual service for users and expect users could "have a good time" with them. Vector animation is style.

02. Keywords

Time An interesting remark, which covers a wide range of subjects. We can't

Nature Time sense it, we live with it. When nights follow days, when spring makes

User Time bloom again after white winter; when years add the age and bring

Visual realize that Time commands all nature.

Visualization

Isometric Pixel Art

Visual Calendar

Intrigued with the magic power of Time and would like to take my
that mythical realm. To visualize how Time works, I intend to create
of interactive for the internet. I started it from brainstorming, and
turn invisible Time into visual images and animations. The first idea
is four seasons of the year. With Time goes by, nature takes its
course and alters its look. Animals have different clothing for all weathers, nature also
puts on different dress with all seasons. I decided, therefore, to let Nature Time be the
first theme in my project. Through computer monitor and mouse click, users could gain
visual experience of nature changes, i.e. day and night, in holidays, and in seasons. To add
the delight in the structure of Nature Time, a Time Story was made for guiding users
following story line's order to experience different looks of nature. Inspired by the story
of "The Emperor's New Clothes," this Time Story, "Smart pig's New Garden," is also
created for the scholars to make time elements work in close conjunction.

The second theme of the project is an experiment in a new kind of visual calendar. It is

03. Introduction

Time is a theme of interesting remark, which covers a wide range of subjects. We can't see "Time", but we sense it, we live with it. When nights follow days, when spring makes flowers come into bloom again after white winter; when years add the age and bring wisdom to us, we realize that Time commands all nature.

03 • A. Content

I've always been intrigued with the magic power of Time and would like to take my thesis project into that mythical realm. To visualize how Time works, I intend to create the environment of interactive for the internet. I started it from brainstorming, and wondered how to turn invisible Time into visual images and animations. The first idea came up into my mind is four seasons of the year. With Time goes by, nature takes its course and alters its look. As we have different clothing for all weathers, nature also puts on different dress with all seasons. I decided, therefore, to let Nature Time be the first theme in my project. Through computer monitor and mouse click, users could gain visual experience of nature charms in day and night, in holidays, and in seasons. To add the delight in the structure of Nature Time, a Time Story was made for guiding users following story line's order to experience different looks of nature. Inspired by the story of "The Emperor's New Clothes," this Time Story, "Smart pig's New Garden," is also created for the solution of making time elements work in close conjunction.

The second theme of this project is an experiment in a new kind of visual calendar, built

on the idea that users could hand out with themselves by writing and users are able to have a little soul servant to accompany with. Therefore, the concept in this section is based on the User Time, which the user could manage their time by calendar or use it as a personal diary. The special feature of this section is that I created a soul servant for users. I made the hypothetical assumption that users, when keeping the diary, probably are alone here with various moods, some are cheerful, some are gloomy, some are optimistic, and some are pensive. Whatever they are, users can wake the chicken (the little soul servant) up, and see if any service it provides could meet their needs or dispel bad mood at that moment. I try to make the chicken's movement with the sense of humor, based on the intention that users could have a good time at this place and they should not be come over much by bad mood. That is also the reason I named this section as "Lounge in my room." As like stay in their own rooms, users feel free to be with themselves and play around with the little soul servant.

03 • B. Art Style

The Smart Pig's Chinese garden changing its visual look with different time is an essential part in my first section of thesis project. To give users a powerful visualized time feast, I need to make garden images look delicate as much as they could be. Therefore, pixel art is decided to apply on in this section of Nature Time. By using pixel art skill, I can represent garden elements, trees, grass, plants, and flowers in details. This skill is allowed me to control every pixel of the image, and it is great for conveying distinctive illustration look.

As for the section of "Lounge in my Room," since much animation needs to be incorporated in Macromedia Flash environment, vector-based graphics are therefore taken for consideration. Flash is an efficient tool for creating vector art style objects and animating them, it is very beneficial to recycle as many elements as possible to save drawing time and file size. By changing the color, orientation and duplicating the movieclip of the shared elements, I was also able to accelerate the process and keep the file size of the project manageable for web output.

04. Process

The Visualization of Time is divided into two parts, "Smart Pig's New Garden" representing Nature Time, and "Lounge in My Room" representing Users Time. Each of them had its goals needed to be accomplished. I have the following to list tasks for each of them and will explain further individually.

List of Tasks:

(A) Smart Pig's New Garden

- Use pixel art skill to finish garden image and its different appearance of time. They are [(four seasons + Christmas + Chinese New Year) * (day + night)] totally 12 pixel images.
- Design the characters and settings.
- Decide the solution to animate each scene and incorporate whole part with smooth transitions.

(B) Lounge in My Room

- Create a dynamic visual calendar allowing personal message/diary storage.
- Design the characters and settings.
- Decide the solution of layout space for animating characters' movement.

04 • A. Smart Pig's New Garden

04 • A • 1. Learn and use IPA to create 12 images of Chinese garden

Isometric Pixel Art (IPA) was a brand new style of digital art for me before I started out my thesis project. The reason why I decided it as art form to accomplish my first theme was the inspiration from a Japan website named "HYBIRDWORKS" (<http://www.hybridworks.jp/>¹). The designer uses IPA to create one corner of street view and updates its appearance with various events. His delicate design excites my interest to IPA and also infuses me with the idea using IPA to create my garden images.

It was good that IPA doesn't need that much brain power and time to figure out. I started with creating simple icons and small figures following the guide from IPA tutorial websites (<http://rhysd.syntesis.org/tutorial/>², <http://www.kirupa.com/forum/forumdisplay.php?f=6>³). Besides, browsing as many as IPA sites was also a good way to improve my skill in a short time. Though each pixel is the same size as any other pixel, but from other masterpieces I was surprised that it can be any colour I can think of and it can fit together with other pixels, any way I can think of. Here is a useful link helping me search many excellent pixel sites. (<http://www.gawzu.idv.tw/link.html>⁴).

After gathering a base of IPA knowledge, my first concern was getting first time image to be done. However, compared with usual IPA work, the size of my garden image, 740

¹ Masaki Hoshino; HYBIRDWORKS; <http://www.hybridworks.jp/>; 2002.

² Rhys Davies; The Complete Guide to Isometric Pixel Art; <http://rhysd.syntesis.org/tutorial/>.

³ Kirupa Chinnathambi; KIRUPA.COM; <http://www.kirupa.com/forum/forumdisplay.php?f=6>.

⁴ gawzu & parapa; @pixel; Links; <http://www.gawzu.idv.tw/link.html>; 2001-2002.

* 225 pixels, was quite big to challenge, and plus on the subject of garden things, one of the most difficult shapes to create in the isometric viewpoint is organic pieces like trees, flowers, grass which really gave me hard time to tackle. Besides, I'd like to detail my garden work, since detail is what grabs most people's attention. I convinced that simple miniscule things such as light fittings, unknown plants on the wall, or cushions in the house can make a simple setting into an interesting environment, so that people would love to spend for a longer time enjoying studying all the details they can find in this Chinese style garden. For these reasons mentioned above, this image turned out to be a very time consuming job, and took me whole two weeks from an outline drawing to a finished spring day garden (see Figure 01).

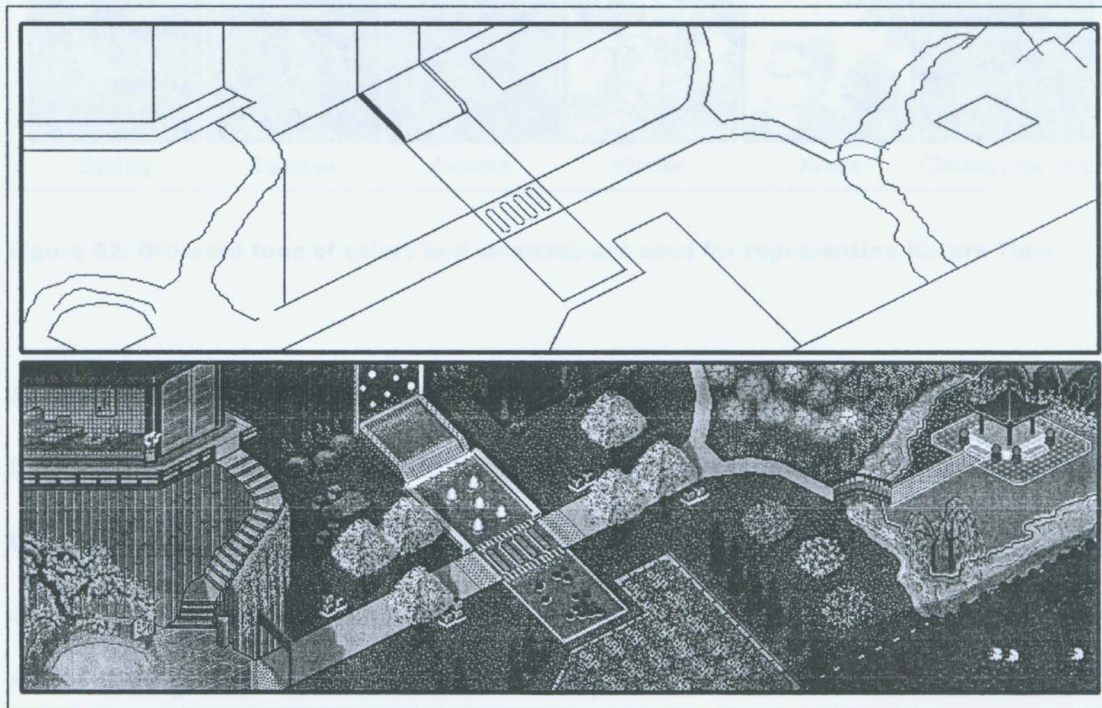


Figure 01. From a outline drawing to a finished garden image of spring day

Although it was not an easy task to accomplish all garden images in limited period, based on the image of spring day I was able to process next eleven time images with less pain. The strategy used for displaying different features of four seasons was built on the replacement of plants and tones of color. As for the image of Christmas and Chinese New Year, holiday elements are necessary to be added in the garden. The step I usually took when I was pixelling a scene, was browse the net using Google Image Search for reference pictures to help me design objects, and also give me the idea as to what colors or texture I needed to use to make it as realistic and good looking as possible.

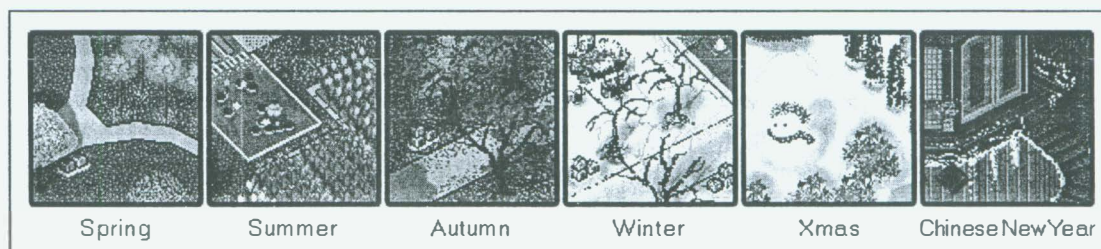


Figure 02. Different tone of colors and elements are used for representing Nature Time

Another thing I would like to mention about is that except using Adobe Photoshop pencil tool, I also used its brush tool to help create big area of shadow and street lighting for the night scenes. According to one definition of pixel art from WIKIPEDIA⁵, "pure" pixel art must be created by manual pixel-level editing, without the use of any automatic filters. Though I admitted that brush tool impacts more or less how IPA work looks, this extra tool was also helpful to speed up the work and boost a shading atmosphere for nights. On the other words, all my effort was to set out scenes to achieve this, that is,

⁵ WIKIPEDIA: Pixel art; http://en.wikipedia.org/wiki/Pixel_art; 2005.

to represent the change of nature time that looks like people could actually experience and function in comfort if it were a real garden.

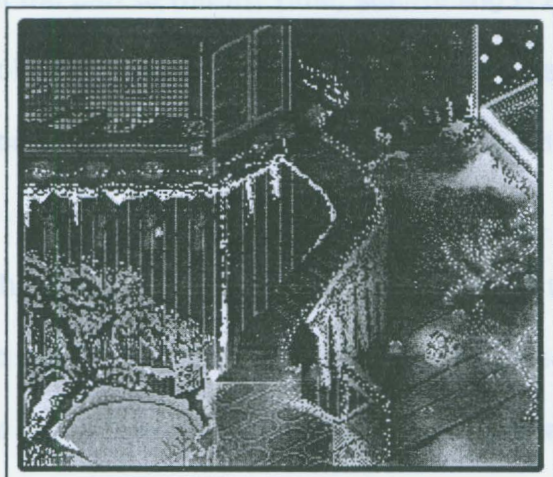


Figure 03. Lighting for night view



Figure 04. Characters sitting for "Smart Pig's New Garden"

04 • A • 2. Design the characters and settings.

In the part of Nature Time, storytelling is also a key chain to keep events moving coherently. Inspired from the story of "The Emperor's New Clothes," I developed the core story, which is "Smart Pig's New Garden" to bind all scenes as a whole.

This story is happened in a timeless mist, there are two Time angels running a bakery to sell Time cakes. Time cakes, as it is named, is a kind of magic cakes given the power to change time. Only Smart Pig, who is smart and competent, can see Time angels and make time change his garden appearance by buying a Time cake from their bakery.

Therefore, the core story line is as follows: the introduction of story, a timeless mist where Smart Pig can find Time angels, get into the Timecake bakery, select a cake, time changed, and next Smart Pig is able to go either mist again or leave this time path.

Setting characters was an enjoyable task for me on a creative level. I choose to base the look of the characters on people and pets around me so that I could ease the process of story development. In accordance with IPA style to this theme, my cartoonish characters were undoubtedly created from pixelling.

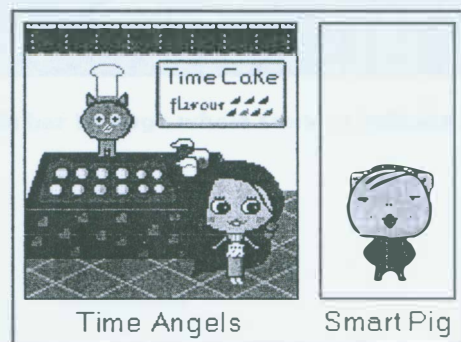


Figure 04. Characters setting for "Smart Pig's New Garden"

Following with the core story line I developed four main scenes in "Smart Pig's New Garden"; they are theme story, the timeless mist, Timecake bakery, and Smart Pig's Chinese garden. Initially I focused on animating each main scene and didn't consider a smooth connection from scene to scene, thereby my thesis committee pointed out that it may cause users' confusion over information communication. They also assisted me by building a "shell" to organize the whole section over consistence. I considered that each scene has been set out independently; therefore, I decided to design a flexible bar fixed below in each scene as the solution for indicating users where they are so that they won't get lost. Besides, taking from the interactive design method I also added transitions running through each independent scene. For the purpose of strengthening the quality of structure, transitions is a efficient way streamlining the story process without having to edit or alter the scenes already created.



Figure 05. Creating a flexible bar through whole story to indicate where users are

04 • B. Lounge in My Room

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04 • B • 1. A dynamic visual calendar

"Lounge in My Room" is a space created for people getting alone with themselves. An experimental visual calendar was designed to store their message or diary data, as they did input at the time. When producing this calendar, I was introduced using Flash local shared object to reach the goal I was aiming for. A local shared-object is functionally similar to a browser cookie. Using a local shared-object is the way to instruct a Flash movie write data to the user's hard drive directly from within the movie. Furthermore, by doing the net search, I was able to collect examples of using shared object to make a calendar which coding and steps were open to share. Therefore, it was helpful that I got code reference and modified it to fit the function of my calendar. After the script was written, next I was able to develop a process for interface production.

Besides, Flash Actionscript is also very handy to create the date object allowing me to make a function convey the current date and time to the user. This date and time information is taken from the user's system clock, and is therefore local to the user's computer. By Flash MX time-based features and functions, I also created timed animation, like display sun/moon and turn on/off wall light, that are triggered at a time appointed.

04 • B • 2. Design the characters and settings

Taking the same method to design my soul servant, I choose to base the look and personality of the character on people I know. This chicken-like soul servant was created for the purpose of providing service to meet the user's need. In this part, before I animated this character, I brainstormed a question: "what do people need when they are alone?" The answer could be as following: beer, a listener, an understanding friend, music, a hug, peace, etc. Then I started to set up six probable situations. I want my character to be interesting, have individual characters, and could deliver his light to entertain the user, since I expected that they could enjoy and have a good time in this "room".



Figure. 06 The soul servant

Figure 06. The space framed with white line is designed for animating. By moving out of the stage, the character is available to users from one side to the other side.

04_B_3. Decide the solution of layout space for animating characters' movement

How to use stage space to distribute the calendar and animation took me for a while to tackle. I tried various layout arrangements to test out it, and then came out with this final version. (Please see Figure 06.) Since the visual calendar was decided to be in the center part of the stage, I utilized the left space, both right and left sides of the stage, for animating the little soul servant. Besides, using the space out of the stage as his travel space, this little friend is allowed to travel from one side to the other side.

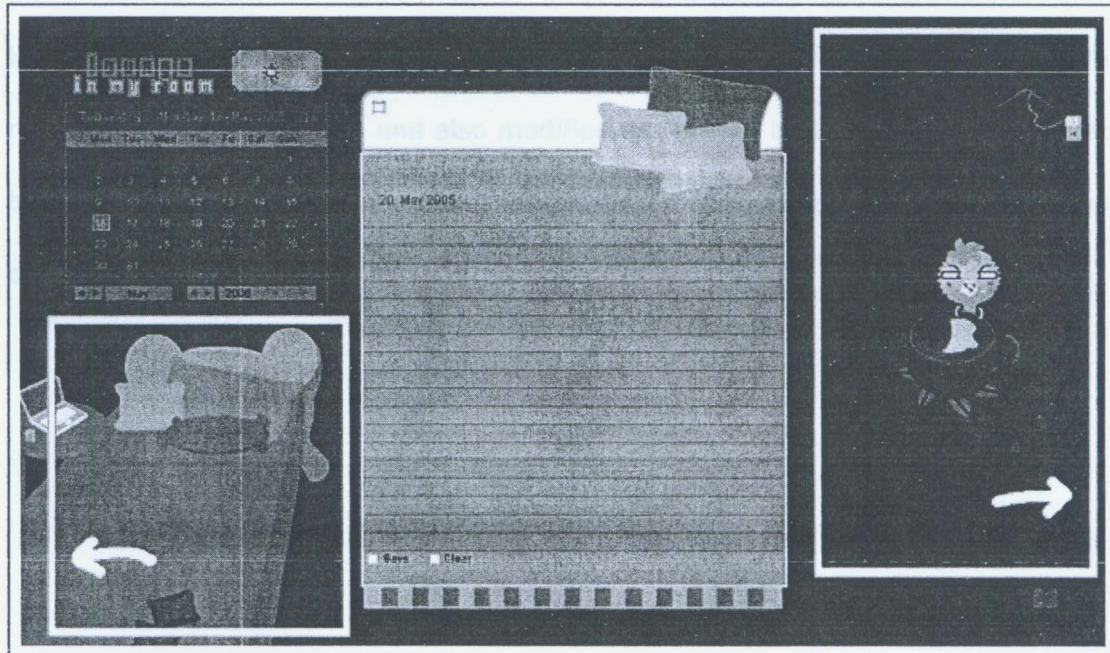


Figure 06. The space framed with white line is designed for animating. By moving out of the stage, the character is available to travel from one side to the other side.

05. Usability

Once the whole project was on the process and almost came to the end, I let people, most of them are in the group of same age with me and computer literate, test on my project. Overall I was happy that characters, images, and animation are attractive to them and competent to lead them to play around the environment I created. But I also noticed that there was some features and function providing insufficient information, so that they kept asking me the same questions, like "Why should I buy Time cake?" "Could this image be clickable?" "How do I end the service from the little soul servant?" By collecting these questions, I appreciated and would like to make further effort improve this project. Therefore, I added more information framed with interactive movement as the solution, and also modified the button to be clearer for the user. I believe that the worth of a project is based on not only its creative level but also its organized structure and user understanding.

06. Conclusion

Time can be an effective creative element which adds more possibility to a project produced for the internet. Turning an invisible time concept into a visual performance not only challenges a designer's control over creativity, but also brings the experience of surprise and interest to the audience.

When undertaking this project, *The Visualization of Time*, I found that the ability to find the most efficient way to accomplish a project while retaining the quality is important a designer could have. However, I didn't chose easy way to go, since I utilized pixel art form to represent twelve time images once driving me crazy, and consuming much time. But I would say it is worth of I learned a new design skill which I love and become more competent to play with in my future work. Besides, I also learned a lesson to deal with the problem for remaining coherent and understandable to the user.

Time is a limiting factor in determining how much of my thesis project could be developed through to completion. Though I have presented the concept into a visual work, this project still has much potential to continue and develop with. If possible, I would like to keep uploading new time images and giving the little soul servant more ability providing more service to the user. Hopefully, this project will serve as a positive example which others can inspire from.

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